THE NAVAL SAFETY CENTER'S AVIATION MAGAZINE

approach

July August 1997

Defending Against GLOC

An H-3 Pilot Describes Engine Failure Number 3

FA-18 Nugget and a KC-135: a Tough Combo

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Volume 42, Number 4 July-August 1997

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Rolling Towa

Returning to work Friday after four days of leave, I was pleasantly surprised that my cross-country request for that weekend had been approved. The instrument class was small as usual, and I figured the instructors who worked that week would take all the available cross-countries leaving few, if any, for us SERGRADs.

On this trip, three jets were headed to NAS Key West for the weekend to have some team fun at a good liberty destination. The plan was to fly the 360-mile leg from NAS Pensacola to NAS Cecil Field, hit the fuel pits, and get right back into the air. With any luck, we could be at our destination early enough to check into the BOQ and get a good dinner.

I knew that if the smallest incident occurred, I might be questioned for taking a cross-country the day I returned from leave. However, I was current, had several hundred hours in the T-2C, and was very familiar with each of our destinations. I even joked with other instructors how I would be doing more groundspeed and fuel checks than my student, so that nothing would catch us by surprise. I wasn't about to let anything happen on this flight.

The weather brief showed clear air throughout our route, and the flight brief was standard. We had some maintenance delays on deck, which meant we would have to catch up with the other guys at our destination. Once airborne, we confirmed the winds were as forecast and decided to fly at mil power minus 2 percent because we had plenty of gas for the short leg.

We continuously compared fuel figures and groundspeed checks, and they indicated that we would land well above the SOP minimum fuel on deck following a GCA.

After taking some unusual vectors from approach control, we entered the GCA pattern with just enough fuel for one approach. This was a crew-coordination flight, so the SNA flew in the front, and I controlled the radio and the navaids in the back.

Shortly after lowering the gear on final, the student reported that the flight controls were very stiff and felt like they might be binding. Taking the controls, I noticed they were indeed stiff as if the hydraulic boost was off, but there were no other abnormal indications. We accelerated to 20 knots above on-speed and declared an emergency with tower, who cleared us to land.

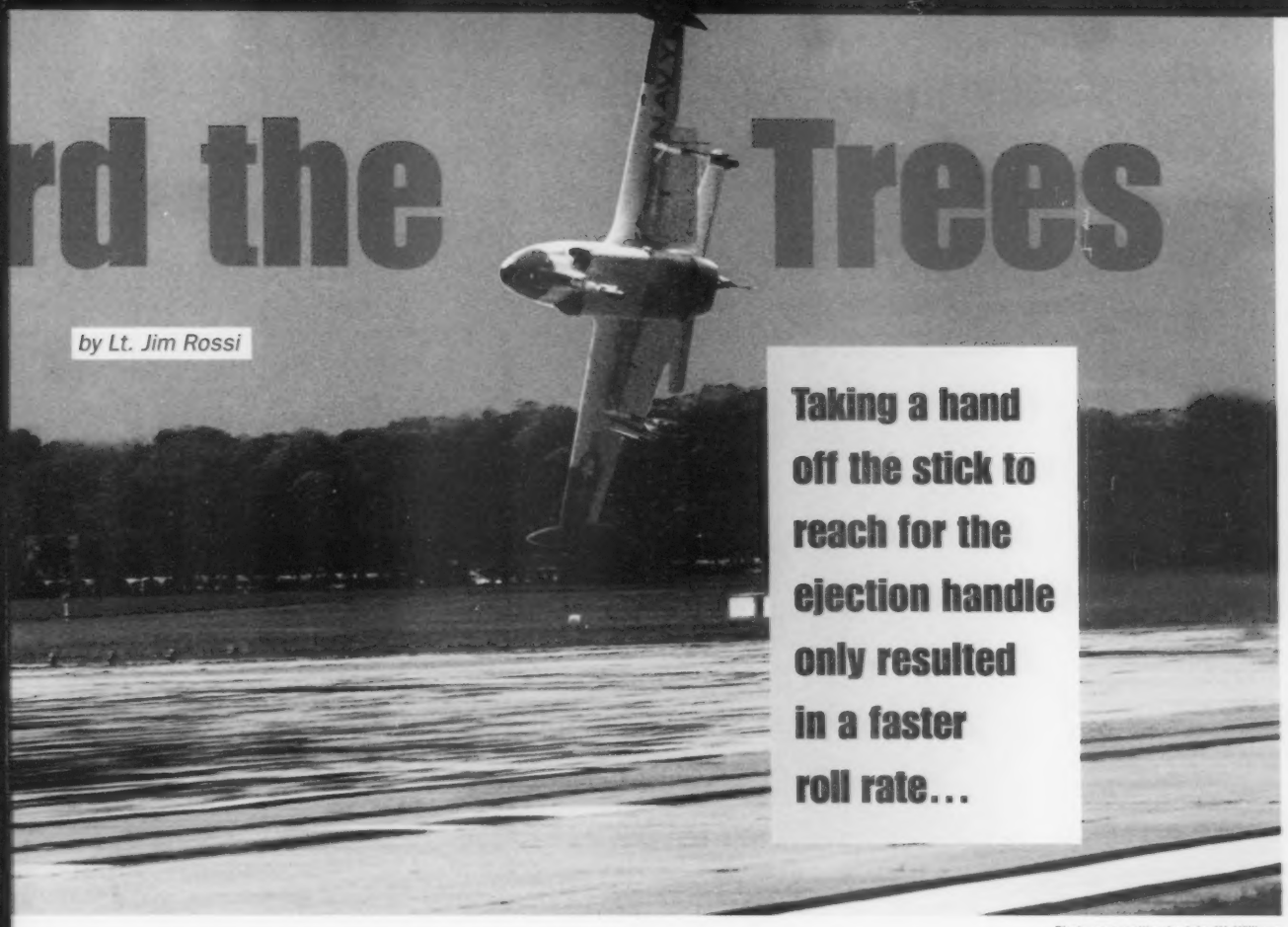
Much to our surprise, passing 200 feet AGL, the stick rapidly moved to the right to full lateral deflection. Instinctively, we both slammed the throttles to mil, grabbed the stick with both hands, and were able to stop the roll at between 70 and 80 degrees AOB. Taking a hand off the stick to reach for the ejection handle only resulted in a faster roll rate, and at that point, it was obvious that we both wouldn't make it out.

In the two seconds or less that this sequence took – it felt like about five minutes – we had rapidly left the ejection envelope, and the decision to pull the handle had been made for us. We managed to stop the uncommanded roll and, using rudder, we got the airplane climbing, but not before getting an eyeful of the treeline beside the runway. I don't know exactly how low we got, but I remember hoping our tip tank wouldn't hit the follow-me truck parked on the ramp.

After a close aboard left-to-left pass with the control tower, the uncommanded roll decreased to a more controllable level. We immediately set up for another straight-in, reviewed ejection procedures, and broke out the PCL. As the SNA called out the procedures, I waited to hear, "Hydraulic-boost switch off," but it never came. Had there been a NATOPS change while I was gone?

rd the Trees

by Lt. Jim Rossi



Taking a hand off the stick to reach for the ejection handle only resulted in a faster roll rate...

Photo composition by John W. Williams

I thought, "Anything is possible. He's got the checklist, so he must be right."

Just to be sure, I asked him what steps he was reading and he replied, "Binding flight controls." In all the excitement, I hadn't told him that the emergency was actually a hydraulic-actuator failure. How ironic that this was a crew-coordination training flight. We found the correct page and secured the boost about 30 seconds before we tried another landing. Unfortunately, 30 seconds wasn't long enough to isolate the actuator, and just like the first pass, we found ourselves rolling toward the trees descending through 200 feet AGL. This time we were better prepared and were able to right the jet without losing quite as much altitude on the waveoff.

Our confidence in the jet was gone. Two young guys in good physical condition couldn't stop it from rolling past 60 degrees AOB, and we were down to about 900 pounds of fuel. However, the NATOPS gods were smiling that day, and we were rewarded for correct procedures (better late than never). We flew the third approach boost-off with inputs from the pilot, not the ailerons. We landed with about 600 pounds of fuel and severe anxiety.

Planning for success means preparing for problems and briefing contingencies in case the primary plan doesn't work. We expected the best and almost got the worst. Decide before the flight what constitutes an immediate-ejection situation, and when the time comes, do the right thing. Our preoccupation with the jet's controllability nearly led to disaster. Finally, when assessing the risk of your flights, don't forget that as the planning, briefing, and flight progress, the risk will sometimes change. I had only assessed the risk of this flight with regard to my leave period.

Lt. Rossi flew with VFA-83 before transferring to VFA-106 for instructor duty. This story occurred during his tour with VT-4.

One Hundred Miles

by Lt. B.L. Whitaker

During the military operations in Haiti, I was part of a helicopter detachment on board USS *Whidbey Island*. We had been MODLOC – held within a general location – off Port Au Prince for approximately three weeks, flying daily log runs between the ships in company and Guantanamo Bay, where the squadron had a detachment.

It was my day to go into Gitmo, which was considered a good deal since we could make a phone call and actually walk around on land for a while. It was a 130-mile trip, and squadron SOP called for two helicopters for overwater flights in excess of 100 miles. After flying to Gitmo, we had a good lunch (the finest MREs the island had to offer), made our phone calls, and caught up with the guys on the beach det.

After about an hour and a half, we manned up, I was the junior H2P tasked with the lead back to the ship. As we approached the hold-short, I requested and was switched to tower, which promptly cleared the flight for takeoff to the south. As I continued taxiing for the spot, I felt a sudden unusual high-frequency vibration. I asked if the crew felt it. They had but thought it was a shift in the winds.

After discussing it with the HAC, he took control of the aircraft and took off, since he agreed it was unusual and could not pin down the cause. As soon as we were airborne, the vibration changed slightly but did not go away. We called our playmate, let them know about the vibrations, and continued to troubleshoot with the crew. The HAC said if anyone was uncomfortable with the aircraft, we would turn around and go back to have it checked out.

As I continued taxiing sudden unusual high

Is Too Far

PH2 Charlo Whorton

for the spot, I felt a frequency vibration.

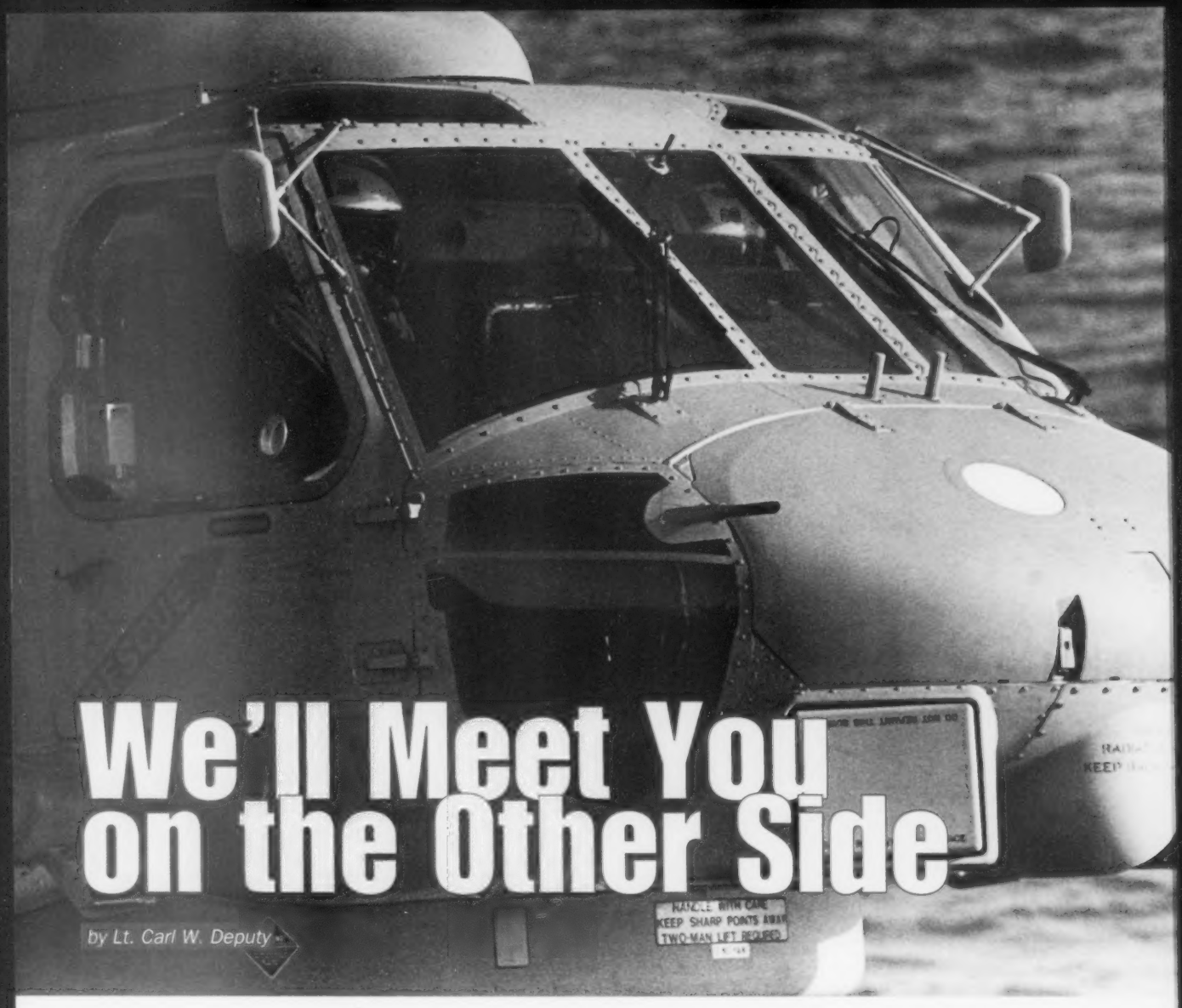
At this point, I stated that I was not comfortable transiting a hundred miles over water back to the ship. We let tower know what was going on and asked for clearance back to the airfield. Tower asked if we were declaring an emergency or required assistance. We told them no, but we requested a precautionary landing. Tower immediately cleared us to land. Our playmate followed us back to Gitmo and landed.

We taxied in and shut down. Before we were out of the aircraft, maintenance had found the problem. The No. 3 viscous damper, which connects two sections of the tail-rotor drive shaft, had disintegrated. Oil had leaked down the tail pylon from the tail-rotor drive shaft cover to the bottom of the pylon. The damper was gone. The damper retainer and drive shaft were badly gouged. The good thing about flying helicopters is that the airframe will usually tell you that something bad is about to happen, generally with enough time to take action.

We spent the night in Gitmo sleeping on cots in an aircraft hangar while our maintenance detachment repaired the aircraft, an uncomfortable night but nowhere near as bad as it could have been if we had continued on to the ship.

I am sure the aircraft would not have flown another 100 miles without the drive shaft departing the aircraft, at which point we would have had a loss-of-tail-rotor-drive emergency, followed by a ditching and an overall bad day. It is quite possible I would not be here today had it not been for aircrew coordination and a squadron atmosphere where each crew member's opinion is valued.

Lt. Whitaker flew with HS-3. He is now assigned to the SH-60F FIT Team.



We'll Meet You on the Other Side

by Lt. Carl W. Deputy

It had been raining all day in our op area north of Puerto Rico, but it was the patchy kind of weather that you could see and avoid easily and measure with the radar. What was surprising was that after flying in and around rain all day, water had not seeped into the nose bay and caused the computer in the digital Automatic Flight Control System (AFCS) to shut off (an all-too-common occurrence in the SH-60B).

We did radar run-ins for the first two hours, staying for the most part in VMC and within 15 miles of the ship. Just as it got dark, we watched the ship drive into a very well-defined wall of rain.

The weather showed up on radar and, though heavy, was apparently only patchy. We radioed the ship and told them we would meet them on the other side of the system they had just entered and continue with the exercise from there. The weather we thought we had a handle on was changing with every sweep of the radar. Although Tacan said the ship was only 10 miles away, we had no radar return because of the heavy rain.

The clearing we had been working in had vanished, and we found ourselves at 500 feet and solid dark IMC. No real threat to us yet, but I looked over at the other pilot and said, "You know, I think I see an

Approach article in the making here." We decided that it would be best to cancel the rest of the events for the evening and return home. At this point, the AFCS computer finally decided it had enough rain for one day and promptly shut down, which left us with only the one analog Stability Augmentation System, which NATOPS says isn't enough for flying in the clouds or at night. Bummer. We couldn't reset the computer, leaving us with a night, IMC, AFCS-degraded approach.

The ship set flight quarters under the MO's direction and began looking for a clear area. The MO reported variable weather that looked to be 500 and 2. The only thing our radar showed was a ring of clutter and shadows. The AW said that shadows formed only behind areas of strong rain that the radar couldn't penetrate. Not good.

We never saw any lightning, but we did hit areas of moderate turbulence that made it hard to keep the helicopter level. At one point, we found ourselves in a 1,000-fpm climb with flat pitch. I turned 90 degrees to avoid the accompanying downdraft, which, incidentally, put us on a long base leg.

The LSO estimated the weather as 300 feet and two miles in moderate rain and fog. At five miles, we started our descent to 500 feet, and at four miles, the LSO suggested we turn on our searchlight. Moments later, he had us in sight and on lineup. We kept descending, calling altitude and range to the ship. At 400 feet and 3 miles, we could make out the whitecaps below.

Two miles found us at 300 feet and descending. Tower said he was turning on the rotating beacon on the masthead, and at 200 feet and a mile we began to see the ship – first the beacon and then the full-bright vertical drop lights. We kept up our speed because as we got closer, we noticed a wall of heavier precipitation just ahead of the ship. The MO reported from CIC that the bridge had attained winds within the tighter AFCS-degraded recovery envelope, and added that I had better not screw it up. The last quarter mile was uneventful.

Lucky? I don't think so. Our successful return can only be attributed to the training we received, the discipline it takes to stay on the gauges no matter how you may feel, and the response from the ship.

Basic instrument flying, AFCS-off, has always been something I've done lots of during those boring blue-water flights, and something I insist that the pilots in our detachment work at every opportunity. Put on the hood, degrade your cockpit, and challenge yourself. One of these days you are going to wish that you had or be glad that you did.

At this point, the AFCS computer finally decided it had enough rain for one day and promptly shut down...

We had done so many tacan approaches (with and without the stabilization equipment) and drills with the ship during our week-one-work-up (WOWU) that even though the ship's tacan consistently produced errors during the WOWU, we knew exactly where the ship was going to be.

The ship responded promptly, setting flight quarters and getting the other pilots to the flight deck and CIC. The bridge also knew how to find the best winds in a smaller envelope while trying to steer to an area that could give us enough visibility to land. NWP 42 was open on the bridge and in CIC.

As a crew, we knew not to push the weather once it had decided to do weird stuff to us. We planned our fuel accordingly and landed with 90 minutes of gas. We coordinated duties with all crew members and handled the emergency just like we briefed.

Lt. Deputy flies with HSL-42.

Flying With a Senior A

by Lt. Tom Bush

What do you do when you can't tell your copilot to shut up? What do you do when faced with an emergency and the copilot you can't tell to shut up is running the show and making decisions you don't agree with?

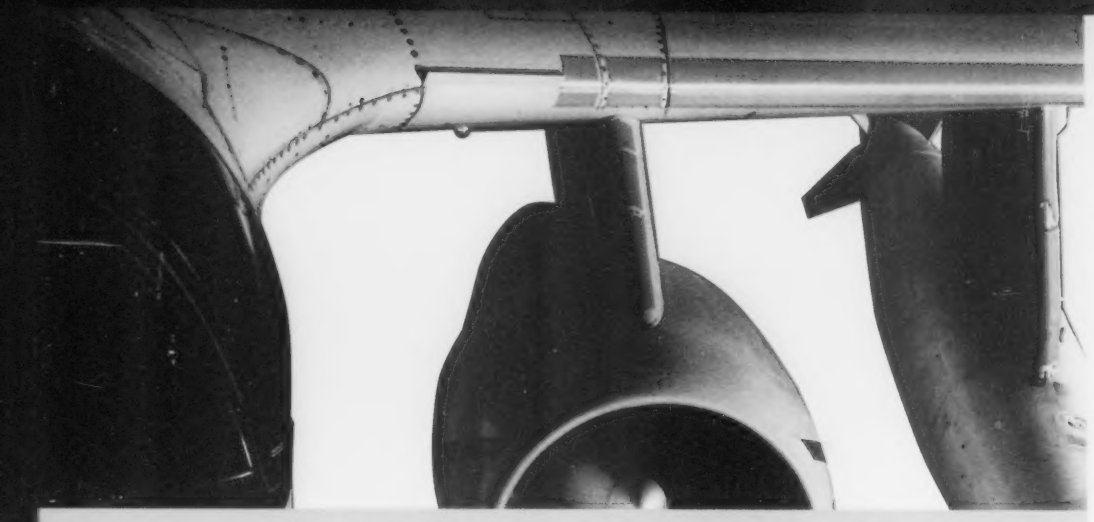
The skies were clear, the mission infinitely simple. If I could fly a 200-mile round-robin to Moody AFB, shoot a few approaches and get us home, I would be instrument qualified for another year.

Complicating the event, however, was my copilot, who had more than 4,000 hours in various aircraft. He was concerned with the most minute details and had scripted them all in block letters on his brief card. Four thousand hours had also convinced him that no one in the left seat could fly without constant input from the right seat. After an hour in the cockpit, I had succumbed to the notion that I was only a voice-actuated autopilot. All my independent decision-making processes had ceased.

We shot the obligatory high tacan with unfailing mediocrity, then pressed to the radar pattern for a few simulated precision approaches. Five miles on downwind at the AFB, the master caution light lit with an associated engine-oil-pressure annunciator. I hadn't looked at the instruments for some time and sure enough, oil pressure on the No. 2 engine was headed south.

Meanwhile, the right seat had become a flurry of activity that included shutdown procedures, canceling our approach, requesting a switch to center and orders to begin climbing and turning toward homeplate, more than 70 miles away.

Now I digress. In the early days of my jet initiation, I was taught to act instinctively whenever something happened to the airplane. Execute the boldface and do it now. Aviate, navigate…you know the routine. All that changed when I got to the multiengine, multicrew side of the house. What the salts in the FRS taught was that, except in rare situations, the first step to any S-3 emergency was to "wind the clock." Not literally, of course, but the message was to evaluate the situation, identify the malfunction, and then outline the response in accordance with specified



viator: ACT Breakdown

procedures, which helps prevent things like securing the good engine instead of the bad engine.

Another neat thing I found in this new training was that other members of the crew were to be included in the handling of emergencies. As time went by, I stopped speeding through memory items without telling my crewmates what I was doing. They, in turn, started knowing almost magically what was wrong with the jet and on what page the problem could be found in the PCL. Together, we would work the switches, dials and checklists, completing the training or the actual emergency in sync with each other.

Back to the story. In the midst of the activity from the right seat, I had managed to secure the engine, start a single-engine climb, and point the nose toward home. Now I had time to think. Why are we going home? What if the other engine runs out of oil? Did anybody wind the clock? I wonder if this will count for my instrument check? My most important concern was how we were going to land. Some semblance of coordination filtered into the cockpit, enough for us to make it back, fly the field arrestment, and head back to the barn.

We didn't really debrief the important items, such as how we should have landed immediately. How we jumbled aviating, navigating. How the crew felt about just being along for the ride. How there was no democracy and darned little coordination in the front seats. But we made it back.

Lessons learned? I could have been more assertive when I felt I was losing focus early on. That senior aviator was an awfully good guy. If I had expressed my concern about him saturating my pea brain with information, he possibly would have listened. Had I been on top of the situation, my instrument scan wouldn't have fallen out. We would have had more time to assess the impending engine failure instead of reacting to it.

It is still up for grabs whether going home was better than landing at the excellent facility five miles away. If we had landed there, the squadron would have sent a rescue jet, mechanics, more oil. That would have been aggravating, but if we had lost our other engine halfway home, they would have had to send a mishap team to the Okefenokee Swamp.

Lt. Bush flew with VS-31 and is now assigned to VT-2.

BRAVO Zulu

BZs require an endorsement from the nominating squadron's CO and the appropriate CAG, wing commander or MAG commander. In the case of helo dets, the CO of the ship will suffice. A 5-by-7-inch photo of the entire crew by a squadron aircraft should also accompany the BZ nomination. Please include a squadron telephone number so we can call with questions.

Capt. T.E. Parent, USAF; Maj. M.T. Ashe, USMC; LCdr. K.R. Christensen and 1stLt. S.A. Cooper

VAQ-129

During a local training flight in a Prowler, the right engine's oil-low light came on, indicating less than 20 percent remaining in that engine. Maj. Ashe (pilot) followed NATOPS and retarded the right throttle to idle. The right oil pressure dropped to 20 psi. He secured the right engine.

As engine rpm decayed and the right generator fell off line, the primary attitude source failed.

Because divert weather was below minimums, the crew returned to NAS Whidbey Island for a single-engine, straight-in approach. With the aircraft in IMC, at 1,800 feet, the secondary attitude source failed, leaving the four crewmen to finish the flight on the tertiary peanut gyro.

Inspection revealed that a 1.5-inch section of a low-pressure-turbine blade had broken off, creating an out-of-balance condition, which caused excessive wear on the oil seals and made them leak. The primary and secondary attitude sources failed because of a recessed cannon-plug pin in the attitude-direction indicator.

Lt. D.P. Carter
Lt. M.D. Chase

VF-143

As the crew of Dog 12 raised their F-14B's landing gear shortly after takeoff from NAS Oceana, they heard a loud boom from the Tomcat's left engine. A stall-warning light and aural tone for the left engine followed.

Lt. Carter (pilot) immediately countered the left yaw with right rudder and set the aircraft attitude and AOA. As the F-14 continued climbing, the left engine's rpm rolled back and switched to the secondary mode.

Safely airborne and concerned about a possible catastrophic engine failure, Lt. Chase (RIO) declared an emergency and told the tower they would enter a right downwind and land as soon as possible.

Lt. Carter retarded the left throttle to idle and began a level right turn to downwind, remaining VMC below a low overcast. After 90 degrees of turn, the left engine stalled again, and the rpm fell to zero. Lt. Carter shut off the left throttle, pulled the fuel-shutoff handle, and lowered the gear, flaps and tailhook.

Lt. Chase read the emergency procedures for single-engine landing from the PCL, and tower cleared the Tomcat for an arrested landing on runway 23R.

Postflight showed the engine had failed, with severe damage to the 8th and 9th stages of the compressor, a rare event in the F-14B.

Lt. R.B. Moss,
Lt. A.L. Chapman,
AE2 K. Reiff,
AMS3 M. Boutelle,
AE2 R. Schlicht,
AMSC R. Rose,

AD2 A. Guerrero,
AD2 D. Decker,
ADAN Cole,
AE3 J. Viney and
AMS1 C. Murphy

HC-4

Black Stallion 48 was on a logistics run to USS *Enterprise* (CVN 65) when the crew discovered that all three landing gear remained up when they lowered the handle. They discovered the circuit breaker for the landing gear was popped and would not reset.

The crew went through the NATOPS procedures for hung gear and actuated the emergency landing-gear blow-down bottle, which resulted in the left main gear extending and locking. However, the nose gear came half-way down, and the right main gear remained up and locked.

Returning to Bahrain International Airport, they coordinated with their det's ground crew to prepare for a gear-up landing. After air-taxiing to the tarmac, Lt. Chapman gently landed on the left main gear, holding the nosegear and right main gear off the deck. AE2 Reiff got out, and with the ground crew, extended the nosegear and pinned it in the down position. The ground crew could not pull the right main out from the sponson, and Lt. Chapman lowered the helicopter onto the pallet support and shut down.

There was no damage, and the MH-53E was flying the next day.

Capt. S.J. Coakley,
Sgt. D.C. Schultz
and Capt. T.R. Parker

HMM-166 (REIN)

While ferrying a CH-46E with nine passengers from MCAS El Toro to a ship during the squadron's SOCEX, Capt. Coakley (HAC) and Capt. Parker (PAC) saw the No. 1 engine roll back to flight idle. Five miles off the coast at 500 feet and 120 knots, Capt. Parker noted the No. 1 torque needle dropping to zero with a corresponding drop in that engine's Ng to below 80 percent.

Capt. Parker went through the NATOPS procedures for single-engine flight, but Capt. Coakley determined the aircraft did not have single-engine capability.

Sgt. Schultz (crew chief) told the passengers to prepare for ditching and prepared the cabin to dump cargo if necessary. He then took his place between the pilots to help with switchology and dumping fuel.

Capt. Coakley took control and continued the right turn toward shore. He determined that the No. 1 engine had rolled back to flight idle, armed the emergency-throttle system, and regained use of the No. 1 engine. He landed at NAWF Pt. Mugu, 15 miles away, where a postflight inspection by the crew chief revealed that the anticipator box for the No. 1 engine had failed.

GLOC: It's Still

by Peter Mersky

Ted Carlson

Initial investigation of a few recent Class A mishaps points toward G-induced loss of consciousness (GLOC). We haven't discussed this important, potentially deadly hazard for a while, but it is still out there. Although GLOC can affect any aviator, it is of more concern in the tactical communities – Hornet, Tomcat, adversary – because so many of their missions involve high-G maneuvers. We need to be aware of the hazard and what we can do to defend against it. We talked the problem over with people from the Norfolk and Lemoore Aviation Survival Centers.

One fixed point is your size and height. Obviously, there's little you can do about your particular dimensions. Shorter people – under 68 inches – tolerate G's better than those who are more than 72 inches. One of the basic reasons is the distance between your brain and heart. The greater the distance your blood must travel to get to the brain to keep you awake, the greater the possibility of GLOC.

General preparation includes eating right and maintaining your physical fitness. A "fighter pilot's breakfast" won't cut it, never

There!

Taking a good breath just before the onset of G, saying "Hoo…" then holding the "k" for 3 seconds, closes the epiglottis in your throat and…

has. Don't stuff yourself before a flight, but a chocolate bar and soft drink are no solution, especially before a demanding mission. Dehydration reduces G-tolerance, so drinking plenty of water is important, especially if you've been exercising that day or drinking alcohol the night before.

Dehydration thickens your blood, making it more sluggish moving through your body. Under G, when your main problem is keeping blood headed to your brain, dehydrated blood has a tougher time moving to keep you conscious. This problem is one of the least-considered aspects of GLOC.

Your physical-fitness training program should also fit your professional requirements. Upper respiratory and muscle conditioning is important in how well you negotiate G's. Weight training and running – aerobic and cardiovascular training – are still important components of any personal program, but those in serious-running programs are likely to be actually hurting themselves rather than advancing their personal G-tolerance. Running more than 12 miles a week may reduce your blood pressure to the point that it takes you longer to pump blood to the brain during a tight turn in the air.

The Navy now recommends balancing your running program with a weight-training regimen that concentrates on conditioning the muscles in your neck, abdomen and especially your thighs. A good old-fashioned workout using squats and a barbell on the shoulders exercises important leg muscles. When you think about it, G's equal weight – a 4-G turn quadruples your weight – and therefore, building your ability to move this increased weight helps both men and women negotiate G's in the air.

By the way, your G-suit will not help prepare you immediately before the onset of G's. Since your suit activates only at the onset of G's, you will have already begun to be affected by the pressure when the suit begins to inflate. Which brings us to the most important defense you have: the anti-G straining maneuver.

Knowing how and when to do this maneuver may afford you as much as a 4-G increase in tolerance; the G-suit gives only 1-1.5-G increase in tolerance. The "Hook" maneuver is now thought to be the best anti-G straining defense; knowing the cycle for each strain is also important. Taking a good breath just before the onset of G, saying "Hoo…" then holding the "k" for 3 seconds,

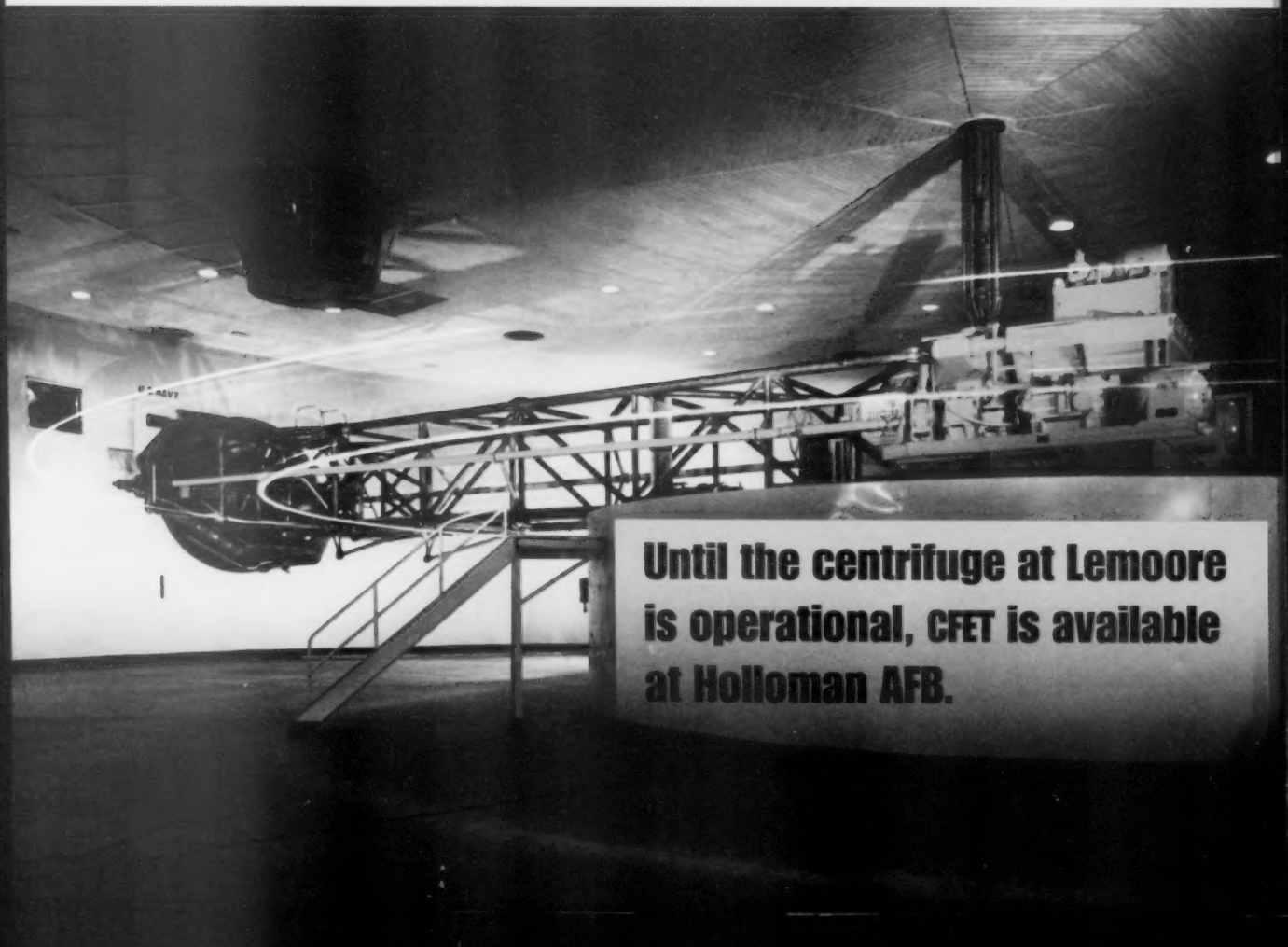
closes your epiglottis and increases chest contraction, forcing blood to the brain, followed by a short exhaling of breath. Allow a second to rest, then go right into another cycle, continuing throughout the G episode.

It takes practice to perform the straining maneuver properly. Take the time to do it right, so that you will know instinctively how long to hold each phase of the maneuver without having to think about it during an engagement.

Another aspect of G defense, one that most physiologists strongly advocate, is the warmup. Before your actual engagement, go through two or three high-performance turns, which produce 4-6 G's, so that you can assess your own reaction. Your G-tolerance varies daily, and you need to know how you feel at a specific time. You can also see if there's anything loose in the cockpit – dirt, pens, candy wrappings – that could distract you. A warmup also tells you how your G-suit is working.

Check with your flight surgeon, aviation survival training center (formerly APTU), and take advantage of the centrifuge facility at Lemoore when centrifuge-based flight environment training (CFET) is available – probably by the third quarter of FY97. Until the centrifuge at Lemoore is operational, CFET is available at Holloman AFB. Much like the D95 helo dunker, CFET can be intense and occasionally stressful, not the way most folks would want to spend a few days. But like the D95, CFET's benefits can become immediately apparent during a mission.

Thanks to LCdr. Keith Syring and Lt. Lee Vitatoe of the Norfolk Aviation Survival Training Center and to LCdr. Dave Service of Lemoore's ASTC for their help with this article.



Until the centrifuge at Lemoore is operational, CFET is available at Holloman AFB.

Pop-Ups

- IFLOLS Improves Your Approach
- Suits Coming Apart at the Seams
- Almost a Photo Finish
- New Flight-Planning Software
- When Will GPS Be in Your Cockpit?
- Foreign Tower, Foreign Language?

IFLOLS Passes Tests

IFLOLS (Improved Fresnel Lens Optical Landing System) recently proved it could serve as the primary visual-landing aid on board USS *George Washington* (CVN 73).

The enhanced resolution of IFLOLS's indicator-display unit, which is 72 inches tall, gives an increased glide-slope display, enabling pilots to fly more precise approaches to the lens.

Eight test pilots (including five air-wing-qualified LSOs) determined that pilots could become familiar with IFLOLS after four or five approaches and confident with it after four or five more. They agreed that FCLP buildup for using IFLOLS should consist of at least two day and two night periods.

Suits Unsuitable

Too many aircrew anti-exposure suits are failing MAG-12 maintenance inspection because seams have delaminated. Marines are concerned about the unsat suits, CWU-62A/P, because squadrons face long overwater flights in cold temperatures with limited available SAR resources. Although MAG-12 has only one permanent squadron, MALS-12 has processed more than 85 drysuits this past winter. The seam tape connecting the cotton flock to the neoprene wrist and neck seals is lasting only three-to-five weeks.

This high failure rate not only puts a strain on maintainers and decreases squadron readiness, but it also affects aircrew confidence in cold-weather protection.

MAG-12 has asked COMNAVAIRSYSCOM to redesign the suits to prevent seam delamination and COMNAVSAFECEN to alert the suit users.

The seam-tape failure on the CWU-62A/P is a well-documented fleet problem. The Inservice Support Team at NAWCAD, Patuxent River, Md., is working on a solution. Currently, the only authorized adhesive is MIL-A-5540, NIIN 00-515-2246. Commands should make certain no substitute has been used. Pax River contact is Dave Vatavuk, DSN 342-9214. – PRCS Mike Beck, Aviation Life Support Systems Branch, Naval Safety Center.

Camera Lanyard an In-Flight Hazard

During an AAW mission from a CV, a pilot was vectored to an inbound aircraft. He retrieved a camera from the right rear instrument console to take a photo from the left side of his Hornet. Current policy requires aircrew to carry cameras for over-water missions.

After he took the picture, he swung his arm right to put the camera back. He felt a tug on the lanyard attached to the camera, then did a double-take when he saw it was wrapped around the ejection-seat handle. He quickly untangled it and continued his mission.

Recognizing this hazard, the CO had all lanyards removed from cameras carried in squadron aircraft.

OPARS Program Aids Flight Planning

A new Windows-based Optimum Path Aircraft Routing System (OPARS) program helps aircraft crews plan routes and altitudes. Developed in 1978 for Navy aircraft, OPARS today supports more than 100 aircraft models in DoD and other government agencies.

With easy-to-use pull-down menus, the software combines aircraft-performance data developed from NATOPS manuals with model winds updated every 12 hours. You can get the most current winds by entering your request at 0400Z and 1600Z, when the forecast winds are updated. You can adjust such variables as payload, fuel, drag index, and maximum altitude. The navigation database used by OPARS contains all jet routes, waypoints and airports in the world.

Request copies of the program by writing the Fleet Numerical Meteorology and Oceanography Center, 7 Grace Hopper Ave., Stop 1, Monterey, CA 93943-5501. You can also fax your request to (408) 656-4313 (DSN 878). The request must be on command letterhead and include a point of contact and phone number. If you have any questions, call OPARS program manager Ralph Loveless at (408) 656-4471 (DSN 878).

GPS Update

The program to install the Global Positioning System (GPS) in Navy, Marine Corps and Coast Guard aircraft is now 27 percent complete. With the nation's VORTAC system being dismantled in a few years, GPS will give aviators highly accurate data about position, velocity and time for tactical and airway navigation.

More than 1,000 aircraft have already had the GPS installed. Technicians are integrating GPS into 83 aircraft models. By Fiscal Year 2000, more than 3,600 aircraft will have an integrated GPS.

"GPS in the cockpit is a revolution in navigation that is improving safety, effectiveness and efficiency," said Capt. Paul Novak, Naval Systems Program Manager (PMW/PMA 187), Space and Naval Warfare Systems Command, Washington, D.C.

Navy aircraft receiving GPS this fiscal year include: EA-6B, 72 aircraft; AV-8B, 70; CH-46E, 56; CH-53E, 45; C-12, 45; P-3C, 39; FA-18, 36; and UH-1, 36.

Tower, Please Translate

A P-3 in the GCA pattern almost grazed an SH-60B at an overseas air base, again raising questions about how language barriers affect flight operations.

Foreign controllers may take longer to come up with a translated response for some traffic calls. The timeliness of a warning may depend on their fluency.

U.S. controllers usually receive training only when a carrier battle group is in the area. At other times, most of the aircraft in the pattern are not American.

Most countries are aware of the problem and are trying to improve the language proficiency of their controllers. In problem areas, the Navy has increased its tower manning to expand its responsibility and authority in the tower.

Edited by Bud Baer. Contributors can contact him at (757) 444-3520, Ext. 7246 (DSN 564).

Milestones

Class A mishap-free flight hours:

Command	Date	Hours	Years
HSL-37	12/10/96	25,000	4
VT-86	04/04/97	250,000	20
VP-47	04/12/97	147,882	24
HMH-462	04/21/97	30,000	8.8
VFA-25	05/17/97	8,000	2
VFA-113	05/19/97	100,000	23

Class A Mishaps

The Navy and Marine Corps had 15 Class A flight and flight-related mishaps before 15 April in FY97. The following mishaps occurred since 15 April:

Aircraft	Date	Command	Fatalities
ES-3A	03/21/97	VQ-5	0

Aircraft's port MLG collapsed during landing rollout. *Downgraded to Class B.*

T-45A	04/15/97	VT-21	0

Aircraft crashed in the tower pattern during a touch-and-go.

UH-46D	04/19/97	HC-5	0

Helo lost at sea after dual-engine rollback while lifting load from ship.

CH-46E	05/10/97	HMM-164	4

Aircraft struck the water during a deck-landing-qualification flight at night.

CH-53E	05/21/97	HMM-262	0

Aircraft landed hard during a confined-area landing.

AH-1W	05/23/97	HMLA-167	2

Aircraft crashed approximately 20 minutes after takeoff.

Class A Flight Mishap Rate

	FY97* thru 5/31/97		FY96 thru 5/31/96	
	No.	Rate	No.	Rate
Navy/Marine	20	2.11	27	2.65
All Navy	10	1.37	16	2.08
All Marine	10	4.61	11	4.40
NAVAIRLANT	4	2.09	3	1.39
NAVAIRPAC	2	1.06	8	3.74
MARFORLANT	3	4.72	6	7.04
MARFORPAC	7	6.49	4	3.35
NATRACOM	4	1.64	2	0.87
NAVAIRES	0	0.00	3	3.57
4th MAW	0	0.00	1	3.93
NAVAIRSYSCOM	0	0.00	0	0.00
Non-MARFOR	0	0.00	0	0.00
Non-TYCOM	0	0.00	0	0.00

*FY97 data subject to change.

Tear out this insert!
Post this newsletter until it's old news.

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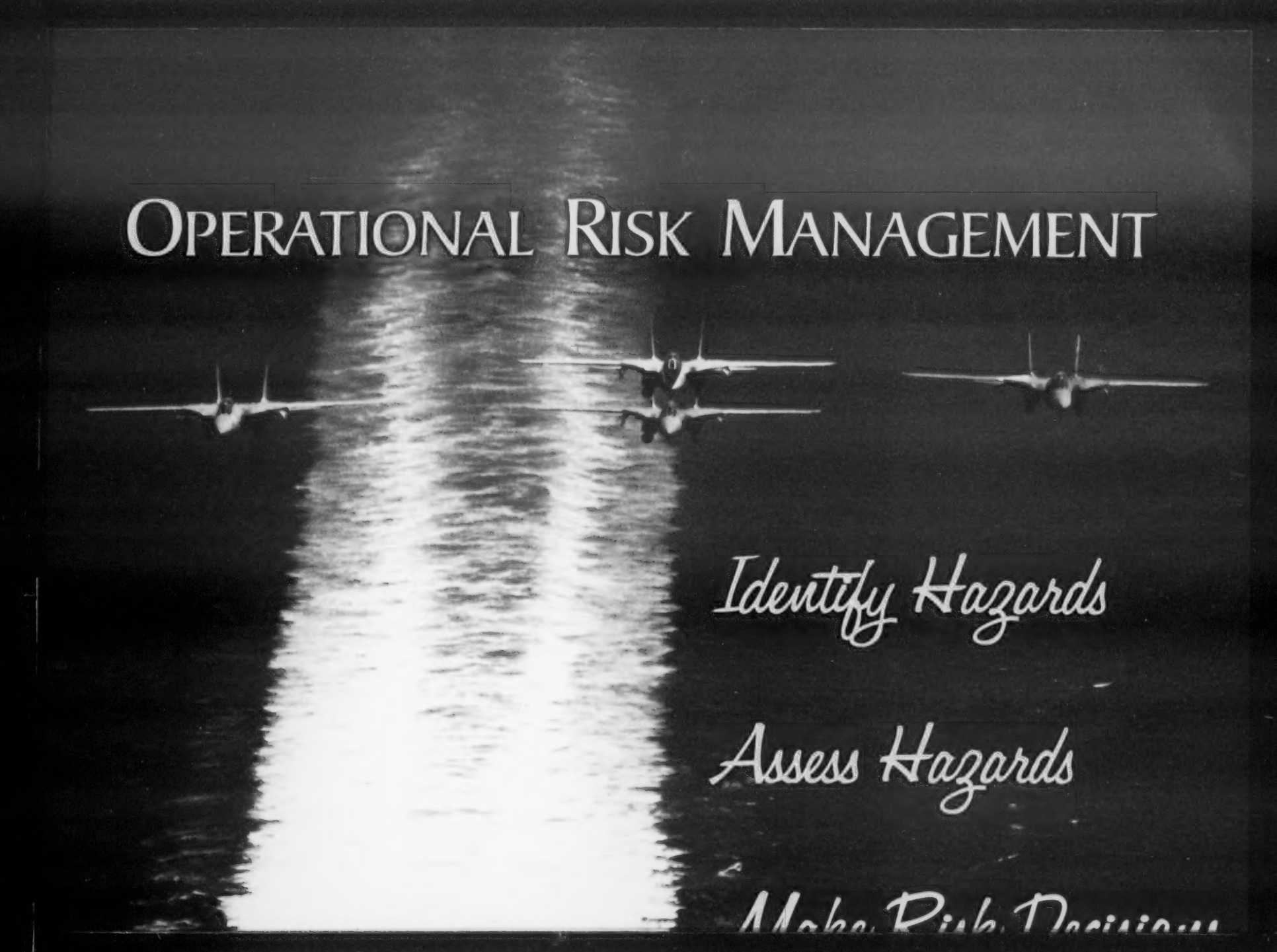

OPERATIONAL RISK MANAGEMENT
Identify Hazards
Assess Hazards
Make Risk Decisions

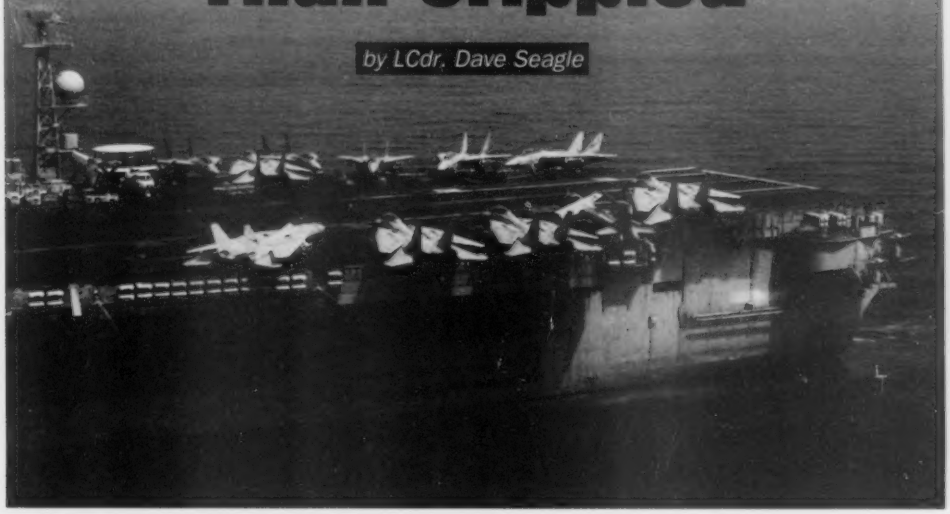
Implement Controls
Supervise
ORM

Lessons Learned

There are two ways to get smart. One is through experience – we call this "the hard way." The other is to learn through others' experiences. The second method is much easier on our machines and bodies.

Better to Be Wet Than Crippled

by LCdr. Dave Seagle



During an aircraft respot on a no-fly day, a blueshirt went to an F-14A on the port side. The Tomcat's tail was over the deck inboard of the LSO platform. The aircraft director briefed where the handling crew would move it. The crew numbered eight, two more than required.

One blueshirt was talking to another blueshirt when the director told them to stay clear of the starboard mainmount.

The director warned them twice. The tail-safety observer also told them to stay clear.

It was raining, and trying to stay dry, one of the blueshirts moved under the starboard wing in front of the main wheel.

The 44,000-pound aircraft rolled forward, immediately trapping his left leg and right foot. While trying to maintain contact with the director, the other blueshirt watched the mishap but couldn't blow his whistle because he did not have it in his mouth while talking with the other blueshirt. The director signaled the crew to stop the aircraft when he saw crew members running to the injured Sailor. His signal came too late. The blueshirt's left leg and right foot were crushed, and the flesh had been torn from his left leg and part of his right leg. Doctors had to amputate his left leg and right foot.

Lessons Learned:

1. Supervisors must take charge!
2. A respot demands complete attention of the handling crew.
3. Heed the warnings of the crew director. The injured blueshirt ignored three warnings to remain clear of the mainmount because he was too busy talking.
4. Keep alert to warn crew members of impending danger. The conversation kept a blueshirt from blowing his whistle to save a crew member.

LCdr. Seagle is an analyst in the Aircraft Operations Division, Naval Safety Center.

I'm Not Paying Extra for the Smoked Squab, Garçon!

by LCdr. Patrick J. FitzGerald

Peter Mersky

The training hop was proceeding nicely. We were flying at a local outlying field in the helo-landing pattern. I was in the left seat, a qualified LAMPS sensor operator (Senso) was in the back, and a Cat I first-tour student occupied the HAC's seat (intent on impressing me with his accurate pattern work and attention to detail). The sun had just set. This flight was the student's first at night in the Seahawk.

The syllabus called for an obstacle-clearance takeoff, a maneuver where the helo lifts off straight up until it achieves sufficient altitude to clear the obstacle. The student pilot was doing a wonderful job and had just transitioned to forward flight when I heard a noise.

There is a standing joke in the LAMPS community about a whining noise coming from the vicinity of the Senso's station (usually along the lines of "Do we really have to do another auto?"). Tonight's noise seemed to be coming from that area, but it was no joke.

In the SH-60B, the Senso sits directly beneath the intake for No. 1 engine. He is normally the first to hear any sort of whine associated with the engine, output shaft or gearboxes. In this case, I heard it first; neither the student pilot nor the Senso initially heard a thing.

I alerted the crew and assumed control of the aircraft. The helo was already over the upwind field boundary, so I began turning downwind. I scanned engine and gearbox gauges for secondary indications that could pinpoint the problem. I also asked the Senso to look around the cabin and try to identify the source of the noise. He thought it was coming from somewhere near the No. 1 engine's intake. I told tower about my problem and requested a transition to the runway pattern with clearance to land. They complied.

Once on deck, the noise went away, which seemed odd. There were no secondary indications on either the engine or gearbox gauges. We discussed the problem and also called the squadron. Maintenance control suggested I turn off the avionics-cooling fan to see if the fan bearing was bad. They also suggested checking to see if the noise fluctuated with power.

The crewman yelled, "The engine's on fire!"

Following this advice, we lifted to a hover with the fan secured. The whining noise came back louder than ever and varied in synch with power. We decided this was enough for us and proceeded to shut down the aircraft. As soon as the rotors were secured, we all got out to look at the engine to see what was wrong. The crewman looked into the engine intake as the copilot shined a light. We all saw the smoke about the same time. The crewman yelled, "The engine's on fire!"

I grabbed the portable fire extinguisher and passed it to the copilot, who passed it to the crewman. Just as he was about to expend the bottle into the intake, the crewman said, "Wait a minute. The engine's not on fire; there's something in here."

That something turned out to be the smoking carcass of a bird. The whining noise had been the bird being ground to pieces by the engine-inlet particle separator. The heat of the engine had cooked the bird. Singed feathers sure stink!

In the blink of an eye, I had experienced two firsts of my career: my first FODed engine and my first bird strike. Luckily, the bird was small, and the engine wasn't damaged. The engine-inlet particle-separator *cum* bird-catcher saved our hides.

This incident reaffirmed the necessity to use all the available information, and stick to your decision. An absence of secondary indications is not conclusive. Don't hesitate to ask for a landing. The safest troubleshooting is always done on deck.

At the time of this incident, LCdr. FitzGerald was an instructor with HSL-41. Following a tour with HSL-49, he now flies C-12s at NAS Sigonella.

S-3 on Fire!

by Lt. Stephen Manning

...the left side of my aircraft erupted in flames.

Aircraft 702 was the hangar queen. Its last flight ended as a Class Charlie with hail damage, and for six months it had been the rob-bird. However, COMPTUEX was coming up, and maintenance had completely rebuilt 702. Two new engines, new flight controls and myriad other fixes had finally made this jet a player.

We tried to fly the first FCF after a very extensive preflight and found only a few discrepancies – a loose panel by the forward canopy that was removed, and leaking hydraulic fluid in the port wheelwell. This FCF ended during post-start checks because of bad spoilers. Two days later, a second try was successful, and 702 was an up jet.

That same day, I was slated for my second FCLP of the day, a local night bounce. A fellow pilot had come down with the sniffles and offered me his early slot. Jumping on it, I went down to read the book – two books, in fact. One binder was not large enough to hold all the gripes that 702 had accumulated during the last 10 flights.

The preflight was thorough once again, as my right-seater and I were mindful of the old hangar queen. An uneventful start-up and final checks gave us a ready jet with 10.0 of gas. On the run-up we noted fluctuating pressure on the No. 1 oil gauge. It was within limits so after a quick discussion, off we went.

On the first pass we called "702, Viking, ball, 10.0, heavy." Next pass we were heavy again with 9.7. That gas seemed to be going nowhere fast. After the third heavy waveoff, we decided to depart the pattern and reenter for the break after burning down to max-FCLP weight.

Approaching the numbers, we heard and I felt a thump. I pulled the throttles to idle and stared at the No.1 oil gauge, sure that we had blown something. We saw no abnormal indications, however, and the airplane

still flew fine. We made an easy turn to downwind.

We took out our flashlights and looked at the leading edges to make sure we hadn't hit a bird. We dirtied up at break altitude, still being cautious. Everything was normal. Paranoid? Well, it was 702.

I smelled fuel. My right-seater said he had smelled it the whole flight. He noticed that our fuel had gone down to 8.9. After evaluating all possibilities, we decided to press. I brought it to centerline instead of the carrier box just in case.

Nothing happened for the next four FCLP passes. Ops normal, a couple of fairs and a couple of OKs. No one noticed a slightly higher-than-normal fuel consumption.

After the full-stop landing, our paranoia was over like the hop, or so we thought. Leaving the active at the 2-board, we called ground for taxi. Approved, we switched to base to report on deck for the hot switch (we were single-radio). They told us to hold our position because of hot brakes on the port side. I stopped and told my right seater to exit the aircraft and take a look, but not to get too close to the gear. I secured the No. 2 engine while he unstrapped. He was in the back cockpit by the door when ground called for me to secure my dumps.

"This is bad," I thought as I brought the No.1 throttle around the horn to secure it. Just as I did, the left side of my aircraft erupted in flames. I thought it was strange that there was no fire light in the fire-pull handle as I secured it. The bright, orange fire hurt my eyes, which were acclimated to the night. My right-seater had the door open in less than a heartbeat, and I was out of my straps and on his heels.

Running my best PRT time yet, I could feel the heat and see the glow of my burning aircraft behind me. I stopped at what I thought was a safe distance. As I turned around, my right-seater grabbed me and pulled me back just as a fire-rescue truck zoomed past the spot I just vacated. Amazed, we watched flames billowing into the night sky. Two fire trucks pressed in from the front and rear of the aircraft. The firefighters attacked the fire, impressing us with the closeness of their assault. We watched as the flames diminished and the scene became a sea of white AFFF. When the flames were out, it was dark once again. Ominous red lights flashed over the stricken S-3. We were both silent, at a loss for words.

After all the paperwork was over, we found out that a fire access door on the engine had ripped off its hinges and punctured the wing fuel tank on the port side. This was the thump we heard approaching the numbers. The fuel had sprayed the left side of the aircraft as we flew the FCLPs. Fuel pouring onto the warm brakes caused them to smoke. The fire did not start until the aircraft stopped and the fuel then ran down the pylon onto the turning engine.

Could this mishap have been prevented? A better preflight might have revealed a faulty door. Tests on the door confirmed the latches had been secured before flight. A force of unknown origin had caused the door's hinges to fail. Should we have aborted when we heard the thump? With this particular aircraft's history, the thump alone could have been reason enough to terminate the hop. However, the fire would have started no matter when we ended the FCLPs. This fire was going to happen and our best defense was our egress procedures, something every aviator must know cold.

I always thought the quickest way out of an S-3 was to jettison the canopy and jump out. Not now. We were unstrapped and out of the aircraft in seconds, no problems. Had I jettisoned the canopy, I would have been exposed to the flames on my side of the aircraft. Had the fire been on the right side of the aircraft, we could not have used the door and would have had to go out the rear canopy.

The heroes in this mishap were the crash crews. Their quick reaction and meticulous technique saved the aircraft from burning to the ground. Had they not been so attentive, this mishap might have happened in the line area, surrounded by other aircraft and a half mile from the fire teams.

Lt. Manning flies with VS-30.

My Third Engine

...I went through the checklist, dumped down to 2,500 pounds, radioed the Air Boss declaring an emergency, and made best single-engine speed back to the carrier.

PH1 Michael D.P. Flynn

My third engine failure was a "routine" emergency, which happened 30 miles from USS *George Washington* (CVN 73) as we flew to a location 50 miles away to conduct ASW. After doing the critical-memory items, my copilot and I went through the checklist, dumped down to 2,500 pounds, radioed the Air Boss declaring an emergency, and made best single-engine speed back to the carrier.

With 45 knots of relative wind over the deck, I shot my approach to land on the angle just past the 4-wire. Just before touchdown, I pulled 110 percent torque. That, plus the 45 knots over the deck, provided a huge safety margin with the operating engine capable of providing 138 percent torque for those conditions.

Routine, yes. But my breathing was rapid, my complexion pasty white, I felt sick to my stomach, and my right hand was wrapped tightly about the cyclic. This episode brought back all the memories of my first and second engine failures – both on the same day, only *five* seconds apart.

On that day, my crew and I hot-fueled and hot-crew-switched into Canvas 616 and launched for a scheduled plane-guard-SSC mission in the Arabian Gulf. The squadron was four months into deployment and flying SH-3Hs.

During the brief, we reviewed how much training in helicopter egress our extra pilot –

Failure

by LCdr. Chris Drennen

he was the ship's assistant air ops officer – had had, and we asked him if he would be interested in some stick time between plane-guard periods. After finishing the after-takeoff checklist, my copilot hopped out of the left seat, and the other pilot got in.

As the switch was taking place, the ASW module called, tasking us to check out surface contacts 10 miles north of the carrier. Transiting at 150 feet and 100 KIAS, I began evaluating the contacts to determine the proper inbound heading for a photo-rig. I told my new copilot he could fly after the contact evaluation and report.

The master-caution light suddenly illuminated. I glanced down at the warning panel expecting an IFF light, but the "tail takeoff" light was on. I called, "Tail takeoff, full power," over the ICS and simultaneously pushed the speed selectors full forward. The light went out.

"Bob, you're going to have to hop out," I told the man in the left seat as I began scanning the instruments. The first gauge I saw, No. 1 engine Ng, read zero. I immediately scanned No. 1 engine oil pressure. It also read zero. I still saw torque on the engine, so I concluded that the engine had lost a lube shaft. My No. 1 engine was going to fail after a tail-takeoff failure. If this happened, I would lose flight-control hydraulics and wouldn't be able to control the helicopter.

After my initial fear and anxiety died down, I decided that it was not a true tail-takeoff failure because the warning light had gone out before I pushed the speed selectors full forward. I began preparing for a single-engine emergency. The speed selectors were already full forward, so I began slowing the aircraft to 70 KIAS, the optimal single-engine speed.

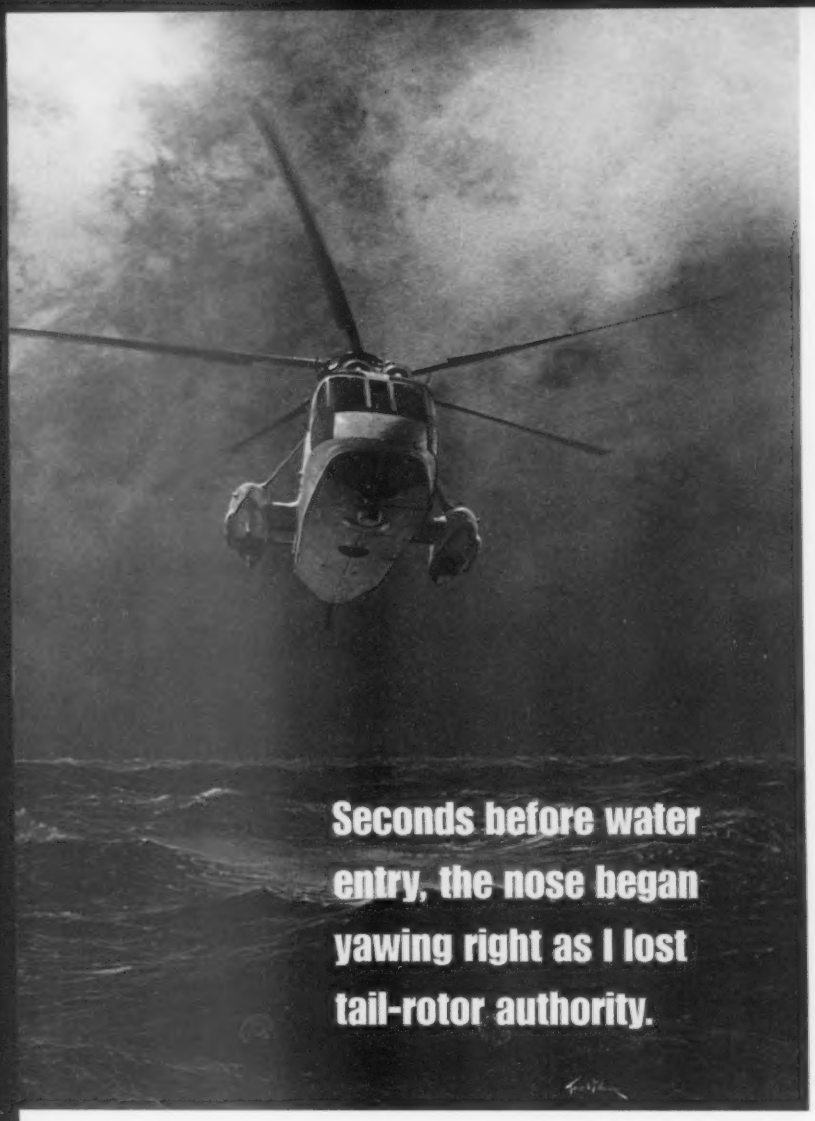
In seconds, I felt like I was starting a practice autorotation with the bottom dropping out. I thought just No. 1 had failed, but the aircraft was not responding as I expected. As I heard Nr decay, I instinctively lowered the collective to maintain Nr. I was dumbfounded. Something was dragging down Nr. Was there another problem possibly related to the tail-takeoff system?

As I glanced at the Nr gauge, Nr was decreasing through 94 percent. I lowered the collective further, all the time hearing the No. 2 engine straining above my head. The helicopter stabilized at 90-92 percent Nr in a descent rate of 500-600 fpm. The fear and anxiety were back with a vengeance.

Passing through 100 feet, I rechecked the position of the speed selectors, confirmed optimum 70 knots airspeed, and tried to scan the center-console instruments. I contemplated using manual throttle to get more power out of the No. 2 engine, but elected not to for fear I would aggravate the situation. Instead, I focused on how I could get the aircraft into the water so that everyone would survive, which was something I was afraid I wouldn't be able to do.

Passing through 60 feet, I made the "Mayday" call on the ASW module frequency and began flaring the helicopter to reduce ground speed and slow my descent. The aircraft began responding better, and I gained a degree of confidence that I could land the helicopter in the water and keep it upright. At 15 feet, I lowered the nose, but my forward speed was too fast.

Still descending, I began cushioning the landing with collective. Seconds before



Seconds before water entry, the nose began yawing right as I lost tail-rotor authority.

water entry, the nose began yawing right as I lost tail-rotor authority. We touched down with the nose approximately 15 degrees right of our entry path. I still thought we might stay upright until the very point that we rolled left and inverted. There was no lift remaining in the rotor system.

From my perspective, it was the helo dunker in fast motion as I saw the water rising toward me. I gulped some air and waited for all violent motion to stop. I could not see anything and could not feel my window's emergency release handle. Now my anxiety increased as I started to feel that I would not get out. I reached down, pulled up my HEEDS bottle, and took one breath. The anxiety and fear were gone. I was able to regroup mentally and move aft to a secondary exit.

Even before I could think of exhaling on the way up, I broke the surface. Right next to me was the AW1. He reported three were out safely. Within seconds, the extra pilot and AW3 rounded the aircraft nose and joined us. The assistant air ops officer never got strapped in during our descent. My regular copilot only got his lap belt fastened and had also used the HEEDS on his egress.

Although I heard no response to my mayday, I knew that we would be rescued soon. The contacts that we were on our way to see were now on their way to see us. However, another Canvas aircraft arrived first and picked us up.

The helicopter remained on the surface for 15 minutes before sinking to the bottom in 165 feet of water. That night, I was the first to talk to the mishap board. I prefaced my remarks by saying, "I know this is going to be hard to believe." I told it like I thought it was. I knew the No. 1 engine failed, but I explained that something else had gone catastrophically wrong. I just was not sure what that something was.

Canvas 616 was scheduled for a last flight to the Arizona desert upon return from deployment. Its salvage was not a priority, but because of COMSEC considerations, the operational chain of command decided to recover the aircraft. We salvaged the helicopter and sent it to Bahrain, where the engines were removed and sent to Cherry Point while the main transmission corroded to dust in Bahrain.

The results of the engineering investigation revealed that the No. 1 engine failed because a front-frame accessory drive failed, causing a loss of mechanical drive to the fuel-pump and fuel-control assembly and

a rapid loss of fuel pressure. The engine flamed out.

The No. 2 engine could not produce normal rated power or topping power because of a disruption of normal airflow and an over-temperature condition in the gas-generator turbine section. The engineers determined that the over-temp condition probably came from airflow disruption associated with a FOD-compressor stall. The engine was FODed.

The engineers attributed the damage to external debris instead of internal FOD. However, the No. 2 engine ran perfectly during the first sortie, the hot-fuel, hot-crew switch took place on spot 3 1/2, and I was airborne for about 10 minutes with no abnormal indications. I think the FOD was an internal failure that happened just after I called for topping power.

The lube-shaft failure I diagnosed in the air was actually a radial-driveshaft failure. The engine failed right after I checked its torque. Whereas I thought the aircraft started falling when No. 1 engine failed; the No. 2 engine kept us airborne until the massive FOD damage. Although I had tried to scan No. 2 engine's performance instruments, I couldn't concentrate on them enough to see them. Imagine an autorotative scan that includes center-console engine performance instruments.

However, I did see an indication that should have told me that No. 2 was not putting out normal power. During the descent, I read 65 percent torque on No. 2 engine. Preflight calculations predicted 110 percent torque. An engine set to drive a rotor head at 100 percent Nr should have gone to topping with low Nr. I forgot this fact during the emergency.

Unfortunately, I lost too much Nr just before we hit the water. The air temperature that day was 94 F, with near-100 percent humidity and calm winds. If I had flared just a couple of degrees more at 60 feet, I would have kept the aircraft upright.

However, there are a few things that I feel good about. I correctly interpreted that there was no tail-takeoff failure. Also, I reacted to decreasing Nr. The SH-3H NATOPS addresses the main-rotor decay rate following a single-engine or dual-engine failure. A five-percent decay per second can be expected with single-engine inflight failures that require 74.5 percent torque. For a dual-engine failure, rotor rpm decays to an unrecoverable state with resultant loss of control unless you enter autorotation immediately. I was somewhere in between, but I did maintain attitude control all the way down.

My decision not to try manual throttle was correct; this would have most certainly aggravated the situation.

The HEEDS bottle worked. I got out because it was a part of my aviation life-support gear.

The entire emergency took 20-25 seconds. Every brief for every flight covered dual-engine failure. However, this 1.5-engine failure caught me totally by surprise. If I had to do it all over again, I am sure I could do better. I made some right decisions and some wrong ones, but in the end, I was only flying the emergency symptoms and hoping for the best. In the helicopter world, rotor speed is life.

LCdr. Drennen was flying with HS-5 at the time of this incident. He is currently assigned to the Manned Space Flight Support Office at Patrick AFB.

...I thought the aircraft started falling when No. 1 engine failed; the No. 2 engine kept us airborne until the massive FOD damage.

Moments From Disaster,

by LtCol. R.E. Joslin

The first two parts of this article appeared in the January 1989 and January 1990 issues of *Approach*. We had had 10 Class A helo mishaps in eight years with "excessive angle of bank and/or excessive rate of descent close to the ground" as a causal factor. Those mishaps killed 34 aviators. A recent HH-60H mishap with the same causal factor resulted in three fatalities. It may be time to revisit this subject.

What are the consequences of rolling into a bank close to the ground? Figure 1 illustrates how our apparent weight (G-loading) increases proportionally with the AOB when we maintain our initial altitude and airspeed by applying the required collective power. For example, a 10,000-pound aircraft in a 60-degree bank, maintaining altitude and airspeed, will have an apparent weight of 20,000 pounds. But what happens if we do not have the power available to lift twice our weight, or if we do not apply collective power immediately upon rolling into the bank?

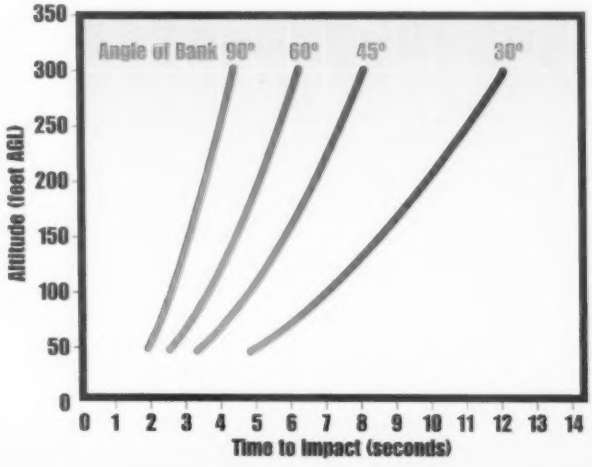
Assume that we are flying along at 300 feet above ground level and roll into a 60-degree bank while maintaining our airspeed but without increasing our collective power. How long will it take before we hit the ground? Figure 2 plots the time to impact from various entry altitudes and AOBs. Actually, the plotted time to impact corresponds to when the altitude-sensing port hits the ground; obviously, the main rotor will hit first.

This plot is independent of the type of aircraft or gross weight and is merely a function of AOB. Note that any partial application of collective power or reduction in airspeed will increase the time until you hit the ground; conversely, any power reductions or increases in airspeed will decrease the time. Also, an initial descent rate at entry will decrease the time; any initial rate of climb will increase the time.

Figure 1. How Heavy Does Your Helo Feel?

Angle of Bank	G Load	Apparent Weight (pounds)
0	1.00	10,000
10	1.02	10,200
30	1.15	11,500
45	1.41	14,100
60 (OPNAV 3710.7 limit)	2.00	20,000
75	3.86	38,600
85	11.50	115,000
90	∞	∞

Figure 2. How Long Until You Hit the Ground?



Revisited

Consider our example of starting at 300 feet AGL and rolling into a 60-degree bank without any power adjustment while maintaining our entry airspeed. The time to impact is approximately six seconds, which is probably how long it took you to read this sentence. A moment's hesitation in applying collective power when rolling into an angle of bank at low altitude may result in a descent rate that may not be recoverable.

Even after you roll wings level and start a dive recovery, the aircraft will continue to descend (Figure 3). On any given day we can determine our maneuvering envelope, which may be less than the NATOPS or OPNAVINST 3710.7 60-degree AOB limit, by reviewing our energy-to-maneuver and excess-power diagrams published in the assault-support helicopter tactical manuals. The fixed-wing community has been using these diagrams for years, mainly as tools to compare their capabilities to those of their adversaries. The diagrams show an aircraft's ability to maneuver based on its excess power. Excess power is the difference between the power available and the power required for straight-and-level flight under a given set of atmospheric conditions, aircraft loads and configurations. The excess power can be used to climb, roll into an angle of bank or a combination of the two.

In some cases, maneuvering may result in too little power instead of extra power, causing a descent instead of a climb. For example, we decide during preflight planning that our mission must be flown at 100 knots. If we then roll into a bank more than 50 degrees and maintain our 100 knots, even while applying full collective power, we will descend (Figure 4). Planning can define what an excessive angle of bank is for the mission profile on that day and prevent another mishap with the same old causal factor.

LtCol. Joslin is the operations officer at the Naval Test Pilot School.

Figure 3. Dive Recovery and G's (ref: NWP 55-3).

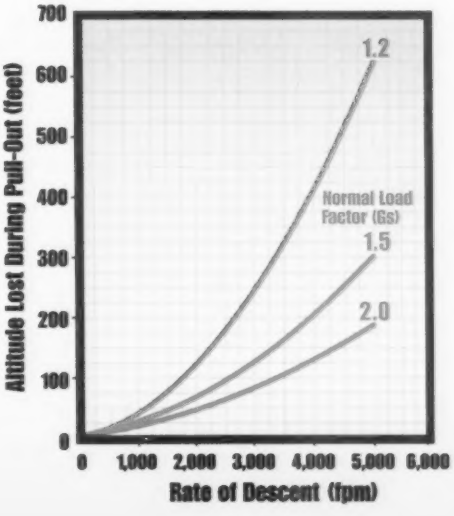
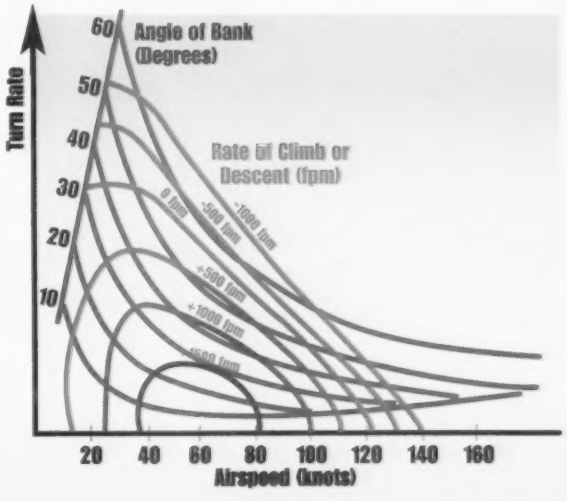
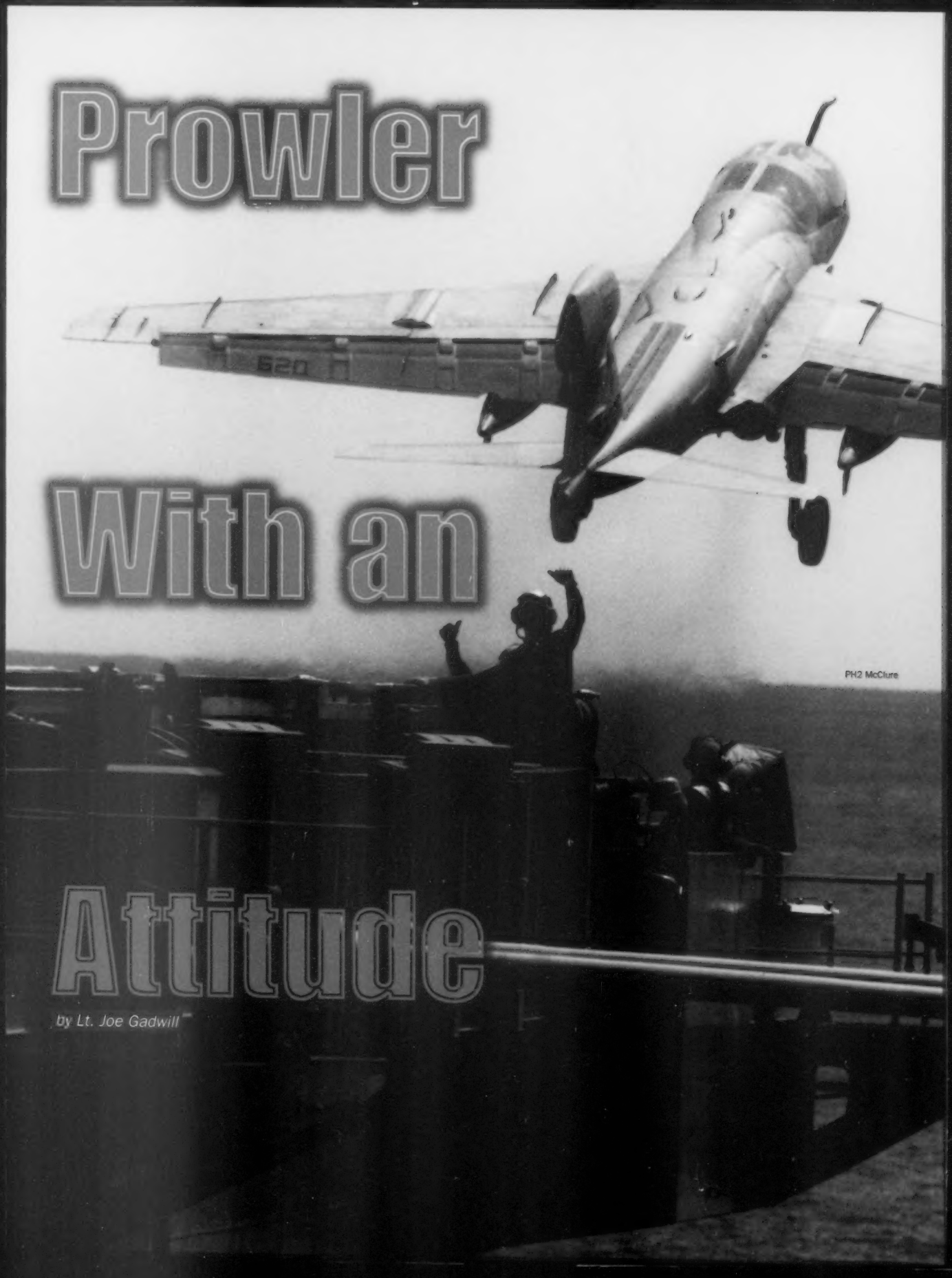


Figure 4. Representative Energy to Maneuver.



Prowler With an Attitude



PH2 McClure

by Lt. Joe Gadwill

"Something's wrong with the trim. I've got a lot of back-stick and can't work it out."

"What a great day to be in naval aviation," I thought as I stepped out onto the flight deck. The weather was CAVU, the temperature was mild, and there was only a hint of the afternoon haze that seemed to envelop the Adriatic every day. We had briefed an opposed strike on a constructive target defended by a division of air wing Hornets.

A mixed division of Tomcats and Hornets would provide High Value Asset (HVA) CAP, protecting us so we could wield our HARM and trons. Our flight had another good deal: we were a relatively junior crew, so we all were looking forward to a good time.

The man-up (45 minutes early under the boss's watchful eye), start-up, and taxi to the cat all progressed without a hitch. We knocked out the before-takeoff checklist and stopped short of the JBD, where we sat and waited our turn for the E-ticket ride.

As the JBD came down, my pilot double-checked the configuration and gauges, reiterating, "Slats out, flaps 30, stab shifted, trim zero, zero, six point five." I rogered his mantra, called the checks complete, and reminded him we would need a left clearing turn (what would they do without us?).

The shooter put us in tension while my pilot ran 'em up, wiped out the controls, checked instruments and saluted. Off we lumbered down the cat. With a good stroke, I continued to focus on the engine instruments as he brought the gear up and began the clearing turn. I called, "Three moving," and started looking for 185 KIAS in anticipation of the "Flaps, slats" call. Although I noticed he was really having to work the trim button, I didn't give it a whole lot of thought.

Up, clean and isolated at 500 feet, I gave my pilot STAB AUG somewhere around 300 KIAS. The input was good, but he came up on the ICS saying, "Something's wrong with the trim. I've got a lot of back-stick and can't work it out."

He immediately looked down at the stab-trim gauge, saw it at 11 units, nose up (max travel is 12 units), and hit the Automatic Flight Control System (AFCS) emergency disconnect.

"We've got runaway trim."

We were now about five miles out on the Case I departure, and he started to slow down to 250 KIAS to relieve some of the stick force. With the problem identified, I said, "All right, let's continue out to seven miles, then we'll climb to 12K overhead mother and take a look at the PCL." Our squadron's rendezvous altitude was 12,000 feet.

We made the climb, checks were complete; then I checked in with the E-2 controller and told him we wouldn't be able to play today. I broke out the PCL and ran through the steps, but they didn't offer much help. My pilot had completed the boldface with the AFCS disconnect, and the remaining steps were only pertinent if you were lucky enough to notice an insidious runaway condition. The trim was already full nose-up, and the damage was done.

I explained the situation to the Boss and asked for a rep. My pilot dropped the flaps, increasing the angle of attack to reduce the back-stick pressure. Even though NATOPS states that the Prowler is completely controllable in this configuration, it can be tiring

for the pilot. We were still pretty heavy, and the constant force he was applying was starting to take its toll.

Our only other option at this point was to engage the AFCS in the altitude-hold mode and see if the aircraft would trim itself. Our rep confirmed this procedure, but we had no luck after several tries. We decided to get beyond 10 miles, descend, and go dirty to see if that would have any effect. My pilot now had some serious doubts he would be able to land at the ship because holding altitude was getting harder. He had to fly with two hands on the stick, or alternately switch hands and shake out the fatigue in the free arm. He also began to feel the pistol grip and trim button on the stick heat up (no, he wasn't squeezing black juice out of it, but it didn't help that his glove was worn through on the forefinger and thumb).

We now resigned ourselves to the fact that the pilot would have to muscle it in, so we set a course for a 10-mile straight-in...

Our rep told us the Boss would take us at the end of the recovery, so we set up a bingo to Brindisi that would give us three looks at the deck.

We tried engaging the AFCS in the dirty configuration several times with no effect. A senior pilot in the squadron suggested releasing all stick force and then trying to engage it. We tried this a couple of times, but it only led to a severe pitch-up, and we quickly decelerated through 120 KIAS. Departing dirty, at 5,000 feet, would be a bad thing.

We now resigned ourselves to the fact that the pilot would have to muscle it in, so we set a course for a 10-mile straight-in, descended and got the dumps on. We called out the descent checks and started taking another look at the PCL when I thought, "This is just how people fixate on something and end up flying into the water." I was just about to key the ICS to call for eyes out of the cockpit when I looked at three o'clock and saw a gear-down Hornet about to pass less than 200 feet over us. As I called the traffic, my pilot said, "Here comes another one."

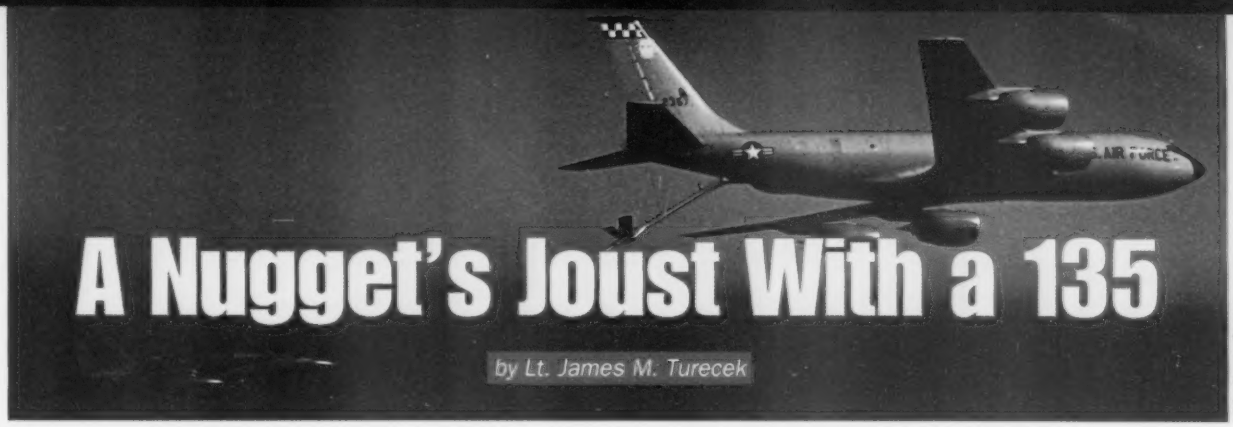
Passing from nine o'clock to five o'clock in about a four-G turn (nice vapes) was a second Hornet. The first Hornet took station on our nine o'clock and asked if we needed help. We were confident of our configuration so we said, "No, but thanks." Turned out the second Hornet had been vectored by his GCI on the Strikex and was coming to shoot us down! A kill's a kill, I guess.

Abeam the ship at 10 miles, we asked our rep if we could get a Mode II. We secured the dumps slightly below max trap. Now aft of the ship, we got lock-on at eight miles. The ACLS needles were a real bonus because they gave the pilot something to focus on and let him catch deviations quickly (he was still having to fly two-fisted). He flew an excellent Mode II to the ball call at three-quarters of a mile, then released his left hand and took control of the throttles. We trapped with a 2-wire and an OK underline.

In retrospect, we could have tried a few other things to get the AFCS to engage. Instead of releasing the stick force in level flight, we could have gained more altitude, then unloaded the aircraft and tried the engagement while the jet was leveling out and climbing on its own. My pilot could have also tried releasing the stick grip and controlling it by grasping the metal post below the grip. This would have released pressure on the AFCS sensors internal to the grip without having to deal with the pitch-up. As it turned out, however, the trim/AFCS wiring in the stick grip was crushed and shorted out (accounting for the heat buildup). Either way, we had done everything we could think of, and the press was on to make the recovery.

Fly the aircraft first. If you have an emergency off the cat, focus on gaining airspeed and altitude. When troubleshooting a problem, exercise all your options, but make sure you don't put yourself in more trouble. Keep an eye on the big picture and always keep looking around. It doesn't do much good to kill all the snakes in the cockpit when there could be one waiting to bite you just outside.

Lt. Gadwill flies with VAQ-141.



A Nugget's Joust With a 135

by Lt. James M. Turecek

LCdr. Steven Gnassi

We were on our last at-sea period off SOCAL with only five days of flying left and surge ops scheduled to start in a few days. Everyone was anxious to get it all over with and head home for a few weeks before heading across the "pond."

I was scheduled as Dash 6 of a Hornet strike package on a long-range strike to Superior Valley. It was to be a good deal for me, dropping four Mk-83 inerts and bagging 3.5 hours of flight time (putting me only 679 hours short of my 1,000-hour patch.)

The brief, preflight and launch went smoothly, and I quickly joined on my lead. It was a surprisingly beautiful SOCAL day as we started to go through the comm drill with Beaver Control and Center.

We were bringing A-6s with us as hose multipliers, and we rendezvoused with an Air Force KC-135. The Hornets had lucked out (yeah, right!) and were scheduled to tank with the KC-135. The first division of FA-18s got their gas and headed off. As my flight lead plugged in and started tanking, it occurred to me that I had only done this once before. It had gone without incident (and my lead made it look so easy), so I thought I had it licked.

Well, as soon as I got behind the basket, I realized that I didn't have this KC-135 stuff down pat. My first try at the basket resulted in a very graceful near miss. On my second attempt, I ended up lipping the left side of the basket with some not-so-graceful PIO. I figured that I was getting closer and that as the saying goes, the third time's the charm. I was right. My third attempt was nothing but net, but as soon as my probe seated in the basket, fuel started spraying profusely from the connection between the probe and the basket.

I pulled out and down to avoid sucking any fuel down my intakes and stabilized at the pre-contact position, expecting some guidance. With no comments from the tanker or my lead, I reasoned that the probe just hadn't seated properly. I tried again.

My fourth try was a carbon copy of the last one, and once again I found myself back at the pre-contact position awaiting some words of wisdom. With still no comments from the viewing gallery, severely behind our timeline and a death grip on the stick that was causing my fingers to turn blue, I just wanted to get my gas and get on with an already embarrassing mission.

With a renewed fervor, I took on the basket with about five knots of closure and, unfortunately, a left-to-right drift. Once again, nothing but net, but before I knew it, the hose had formed an upright "U" and, because of my closure, the basket was now behind the hose!

As I moved left and aft, the edge of the basket got caught on the hose and ripped my probe's tip off. Talk about fuel spray! It was so bad that I actually got some JP-8 in the cockpit through the canopy seal. Of course my lead was actively talking by now, telling me to check my engine instruments because he had seen a huge fireball coming from my right engine.

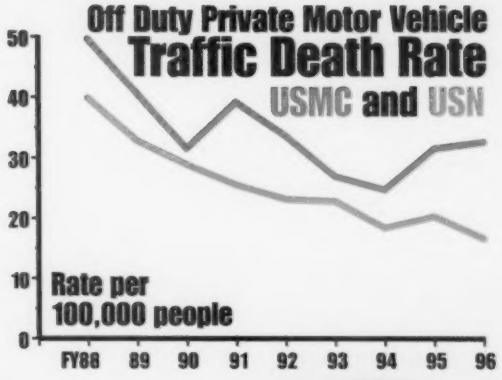
After confirming that I had no secondaries, we realized that the probe tip was still stuck in the basket. The Air Force guys went home with a nice souvenir for their ready room, and I got to spend the night at China Lake after my lead dropped me off. By the way, they have a nice, new VOQ there now.

The VX-9 guys fixed my jet, and the next day I went back to the boat with my tail between my legs. Everyone in the squadron was sympathetic, saying that KC-135s are the hardest planes to tank from, but the more I look back on the whole incident, there were a few other factors that my friends were too kind to mention. Pilot error was definitely involved, as much as I hate to admit it. Also, the KC-135's basket may not have been working properly, although five guys ahead of me had no problems. The probe tip was probably already damaged or worn, causing the initial fuel spray on my second and third attempts.

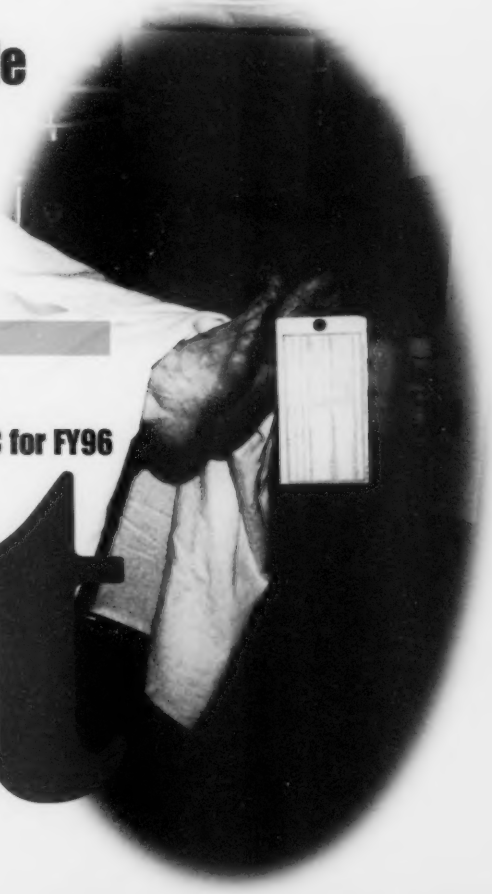
I also learned a good lesson from this hop. When the book says "no more than 2 knots of closure," it means it.

Lt. Turecek flies with VFA-147.

Don't Be A Stat



Traffic Death Profile

Speed	36 Deaths
Fatigue	14
Seat Belts (not used)	41
Alcohol Involved	48
Night	103
Weekend	67

Total deaths = 128 USN and USMC for FY96